NOTES ON THE TEETH OF NOTOTHERIUM MITCHELLI.

No. 1.—VARIATION IN THE UPPER PERMANENT PREMOLAR OF *NOTOTHERIUM MITCHELLI*, OWEN.

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The permanent Premolar tooth of diprotodont marsupials, the only replacing number of the dental series, is most important for diagnostic purposes, it alone being sufficient for the determination of many species.

It is therefore of interest to describe a variation noticed among the remains of *Nototherium Mitchelli* collected in the Mammoth Cave, Margaret River, in the extreme South-West of this State. It must be remarked that the associated lower permanent premolars do not show a corresponding range of variation from the type.

The tooth is described by Professor Owen in the following terms:—"The first upper molar (d^2) may be said to be two-lobed, but it is divided in an opposite direction to that in the rest of the series, viz., into an outer and an inner, rather than a front and a back lobe. The working-surface is sub-triangular in form, the angles obtusely rounded, measuring in fore-and-aft extent 1 inch 1 line in the male *Nototherium Mitchelli;* the transverse diameter, posteriorly, is 11 lines.

The outer lobe or division is the chief one, and constitutes the outer two-thirds and the whole fore-and-aft extent of the tooth; the outer side of its base swells out like part of a cingulum or ridge; the summit is subcompressed, and seems to have been tritubercnlate; the inner and lower divisions consist of a larger hind tubercle and a smaller front one. . . . .; it is implanted by two roots, one behind the other, the posterior being the largest and grooved anteriorly, as if preparatory to further transverse subdivision."†

The Mammoth Cave specimens supply a series of ten upper premolars in all stages of wear, including teeth that have just recently come up into line, as well as others that have been in use for some considerable time.

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† Phil. Trans. Roy. Soc., 1872, page 67. *See* also Extinct Mamm., Aust., 1877, Vol. I., page 275.

They vary in size, the length antero-posteriorly ranging from 22 m/m to 29 m/m, and the width from 20 m/m to 23 m/m. The tooth is markedly tuberculate, consisting essentially of three external and two internal tubercles or cusps. The anterior external cusp occupies a talon projecting from the main mass of the crown and may be connected with the succeeding external tubercle by a bridge of limited development. The intervening valley is bounded externally and internally by a cingulum, which is more prominent on the lingual face of the crown.

The two posterior external tubercles are more massive than those placed internally and are always united by a bridge, reaching almost to their summits in an unworn tooth and forming a strong external lobe.

The antero-internal cusp is also well developed, being in every case larger than the hind one, not "smaller" as stated by Owen; it is joined to the median external tubercle by a slender sygmoidal ridge which is much less prominent and less massive than that forming the external lobe. With wear this group of connected cusps develops into an "L" shaped mass, of which the "twisted loop of exposed dentine" of Scott † is an extreme form.

The smaller posterior lingual tubercle is variable in size; it may be reduced to a slight swelling on the cingulum enclosing the postero-internal portion of the crown, as described in 1912‡, or it may be developed into a mass attaining about half the altitude of its fellows. It is connected with the anterior lingual cusp by a bridge, usually almost obsolete, but on one specimen a strong internal lobe sloping backwards is formed by the exceptional development of the bridge.

The cusp is also united to the posterior labial tubercle by a weak sinuous connection which varies in extent, being quite distinct on the inner tubercle and on the floor of the valley but splitting up into a number of faint radiating folds on the inner aspect of the posterior external cusp.

Only in one instance, that exhibiting the maximum development of the posterior lingual tubercle and the longitudinal bridge may the tooth be considered to resemble the typical example described by Professor Owen, as quoted above. The presence of this tooth in the collection is taken to indicate that the upper permanent premolar is a variable tooth and that the animals in the South-West had not succeeded in establishing a distinct species or geographical race before they became extinct.

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† A monograph of Nototherium Tasmanicum, Geol. Surv. record No. 4, Hobart, Tasmania, 1915, p. 12, and figure.

‡ Glauert. Records W.A. Mus., Vol. I., pl. 2, 1912, p. 41. Pl. vi., fig. 10.

No. 2.—DESCRIPTION OF THE DECIDUOUS PREMOLAR OF *NOTOTHERIUM MITCHELLI*, OWEN.

In marsupials the dental series contains but one replacing tooth —the so-called "permanent premolar." In many of the *Macropodidae* it replaces two teeth, the "milk premolar" and the "milk molar," but as a rule it has but one predecessor, the "milk premolar." The milk premolar of *Thylacynus* is developed and absorbed before the animal is out of the foetal stage, and, in the case of *Phascolomys*, the deciduous tooth is merely vestigeal.

Our knowledge of the dentition of extinct forms is very incomplete; in regard to the *Diprotodontidae* the remarks of Lydekker in 1889,* "So far as we know at present there is no evidence of any tooth change or of the presence of a deciduous pm. 3 in either *Diprotodon* or *Nototherium*," do not appear to have been questioned or modified by more recent discoveries.

A specimen from the Mammoth Cave, consisting of a small fragment of the right side of the skull of a young individual and including the facial portion from the orbit to the socket of the incisor with the dentition and the anterior portion of the palate is, therefore, of particular interest, because of the light it throws upon the dentition.

The teeth present consist of the deciduous premolar in position but showing no trace of wear, and the posterior molariform tooth, still in its formative cavity, but evidently ready to emerge and take its place in the tooth line.

On account of the swollen state of the maxilla below the infraorbital foramen, an opening was made in the wall of the socket of the incisor disclosing the presence of an imperfectly formed successor to the milk-premolar. There is therefore no doubt that *Nototherium*, like the majority of the marsupials, possessed a deciduous premolar and a replacing tooth.

The deciduous tooth is triangular, with a prominent crest externally and a well marked tubercle on a distinct talon at the posterointernal angle of the crown; this tubercle is connected with the cusp by an almost obsolete bridge across the floor of the intervening valley, which is closed internally and posteriorly by a strong sinuous cingulum. This ridge ascends the outer cusp anteriorly, gradually merging into the crest, but posteriorly it rises up the hind edge of the cusp forming a distinct prominence in line with the cusp but separated from it by a well marked notch. The highest part of the

* Annals and Magazine of Nat. Hist. (6), Vol. III., No. 14; Feb. 1889, p. 151.

crest is just in front of this notch; from this point the cutting edge slopes convexly downwards until it merges into the cingulum at the anterior angle of the tooth.

The tooth appears to be implanted by two roots, a very small one at the anterior angle and a very massive one posteriorly.

The following measurements have been taken:—

Antero-posterior dimensions	.. ..	10.5 m/m
External face of crown	.. ..	10.5 m/m
Internal face of crown	.. ..	11 m/m
Posterior face of crown	.. ..	11 m/m